NATUS NES / NES-H Draw-out Type
Medium Voltage Switchgear Systems

Safe energy distribution that meets the highest industrial requirements
NATUS systems offer you high personal and operating safety, secure engineering, easy operation and high efficiency through low life-cycle costs. Take our word for it! Our engineers give you competent support and advice and see your project through from design all the way to commissioning.

**Application**
Power plants, transformer substations and distribution systems and industrial operations such as:
- mining industry
- iron and steel works
- automobile industry
- chemical works
- petrochemical plants
- paper plants
- cement industry
- waste disposal

**NATUS switchgear systems – your advantages**
- minimal use of insulant volumes
- use of standard components with the highest quality
- easy operation
- utmost personal safety

**The switchgears**
NATUS switchgear systems are air-insulated, tested for resistance to internal arc faults and are metal-enclosed with a fourfold compartment.

NATUS switchgear systems are developed and manufactured in our factories in Trier and comply with the highest quality requirements. They are factory-assembled and type-tested in accordance with current standards and specifications.

Upon request, we can also deliver different makes of switching devices as well as innovative technical solutions.

NATUS switchgear systems stand apart because of their minimal use of insulant volumes, use of high-quality standard components, easy operation and utmost personal safety.

NATUS switchgear systems have proven themselves thousandfold worldwide.

**The standards**
Construction of the switchgears as per IEC 62271-200 / VDE 0671 part 200. Tested for resistance to internal arc faults IAC AFLR as per IEC 62271-200 / VDE 0671 part 200 and IEC 60298 App. AA, criteria 1–6, earthquake testing in accordance with UBC 1997, zone 4.

NATUS medium voltage switchgears are standardly performed in accordance to availability classes LSC2B as per IEC 62271-200. The partition class can either be PM or PI, depending on the design.
Draw out Type Medium Voltage Switchgears
NES / NES-H

Compact, type-tested switchgears for indoor installation in accordance with IEC 62271-200 / VDE 0671 part 200

◆ four individually metal-clad compartments for: the main busbar, the switching device, the cable connection and low voltage devices
◆ arc safe
◆ different panel widths: 1000 mm, 800 mm, 650 mm, 500 mm
◆ pressure is released upward in all compartments
◆ optional: delivery with a tested pressure release duct

High personal and operating safety
◆ all electrical and mechanical operating procedures take place when the enclosure is closed
◆ maximized operating safety owing to serial production, complete mechanical interlocking system
◆ shutters automatically protect the isolating contacts when the unit is withdrawn
◆ high availability resulting from the quick exchange of the withdrawable units by means of the universal trolley
◆ make-proof earthing switch
◆ optional: motor operated withdrawable unit and earthing switch

Durable and geared for the future
◆ panels are air-insulated and use a minimum amount of insulant volumes
◆ ideal assembly is possible due to technical and economical factors
◆ assembly of state-of-the-art, low maintenance vacuum- or SF6-switching devices by renowned, leading manufacturers
◆ one can obtain spare parts easily by virtue of the use of standard insulators, standard instrument transformers, standard switching devices and standard copper sections

Highest quality requirements
◆ state-of-the-art manufacturing techniques thanks to a high precision laser cutting system which guarantees perfect dimensional accuracy
◆ distortion resistant cubicle frame made of top quality galvalumed sheet steel that is bolted together
◆ internal arc resistant double sheet steel partitions between panels
◆ busbar partitioning from panel to panel
◆ electrostatic powder coating of the front door and side panels
◆ engineering and manufacturing in accordance with the quality management system EN ISO 9001

Type of protection as per IEC 60259 / VDE 0470 part 1
◆ standard make of the enclosure: IP3XD
◆ further values upon request

Operating conditions
The standard make of our switchgears are designed for the following:
◆ ambient temperature:
  maximum temperature + 40 °C
  24-hour mean + 35 °C
  minimum temperature – 5 °C
◆ installation altitude maximum 1000 m above sea level
◆ humidity
  24-hour mean 95 %
Medium Voltage Switchgear NES:

The switchgear for multifunctional use
◆ draw-out type switchgears for the indoor installation, type-tested, factory-assembled, metal-enclosed with a fourfold compartment
◆ compact panel for contactor feeder that is 500 mm wide
◆ application as a single bus system or as a duplex system
◆ optional: motor operated withdrawable units and earthing switches

The following variations are possible for the conduction of hot gases that result from arc faults:
- deflector plate
- arc absorber
- pressure release duct

Technical data: NES

<table>
<thead>
<tr>
<th>Rated values</th>
<th>up to</th>
</tr>
</thead>
<tbody>
<tr>
<td>rated voltage</td>
<td>12 kV</td>
</tr>
<tr>
<td>rated power-frequency withstand voltage</td>
<td>28 kV</td>
</tr>
<tr>
<td>rated lightning impulse withstand voltage</td>
<td>75 kV</td>
</tr>
<tr>
<td>rated busbar current</td>
<td>2,500 A</td>
</tr>
<tr>
<td>rated short-time withstand current</td>
<td>40 kA</td>
</tr>
<tr>
<td>rated peak withstand current</td>
<td>100 kA</td>
</tr>
<tr>
<td>rated short-circuit duration</td>
<td>3 s</td>
</tr>
<tr>
<td>internal arc fault test 1 s**</td>
<td>40 kA</td>
</tr>
</tbody>
</table>

Dimensions

<table>
<thead>
<tr>
<th>rated branch current up to:</th>
<th>2,500</th>
<th>2,000</th>
<th>1,100</th>
<th>350 A</th>
</tr>
</thead>
<tbody>
<tr>
<td>cubicle width</td>
<td>1,000</td>
<td>800</td>
<td>650</td>
<td>500 mm</td>
</tr>
<tr>
<td>cubicle depth*</td>
<td>1,300</td>
<td>1,300</td>
<td>1,300</td>
<td>1,300 mm</td>
</tr>
<tr>
<td>cubicle height*</td>
<td>2,300 up to 2,500 mm</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>incl. control compartment H = 600 up to 800 mm</td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* plus 92mm for front door and back wall
** tested contactor panel 40 kA / 0.1s
Further values upon request
Medium Voltage Switchgear NES-H:

The high-performance switchgear that meets the highest requirements
◆ draw-out type switchgear system for the indoor installation, type-tested, factory-assembled, air-insulated, metal-enclosed with a fourfold compartment
◆ application as a single bus system or as a duplex system
◆ optional: motor operated withdrawable units and earthing switches

The following variations are possible for the conduction of hot gases that result from arc faults:
  - deflector plate
  - pressure release duct

Technical data: NES-H

<table>
<thead>
<tr>
<th>Rated values</th>
<th>up to</th>
<th>up to</th>
</tr>
</thead>
<tbody>
<tr>
<td>rated voltage</td>
<td>12</td>
<td>24 kV</td>
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<tr>
<td>rated power-frequency withstand voltage</td>
<td>28</td>
<td>50 kV</td>
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<tr>
<td>rated lightning impulse withstand voltage</td>
<td>75</td>
<td>125 kV</td>
</tr>
<tr>
<td>rated busbar current</td>
<td>4,000</td>
<td>2,500 A</td>
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<tr>
<td>rated short-time withstand current</td>
<td>50</td>
<td>31.5 kA</td>
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<tr>
<td>rated peak withstand current</td>
<td>125</td>
<td>80 kA</td>
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<tr>
<td>rated short-circuit duration</td>
<td>3</td>
<td>3 s</td>
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<tr>
<td>internal arc fault test 1 s</td>
<td>50</td>
<td>31.5 kA</td>
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</table>

Dimensions

<table>
<thead>
<tr>
<th>rated voltage</th>
<th>24</th>
<th>12</th>
<th>12</th>
<th>12 kV</th>
</tr>
</thead>
<tbody>
<tr>
<td>rated branch current up to: (natural / air cooled)</td>
<td>2,000</td>
<td>2,900</td>
<td>2,500</td>
<td>350 A</td>
</tr>
<tr>
<td>rated branch current up to: (forced ventilation)</td>
<td>–</td>
<td>3,800</td>
<td>3,300</td>
<td>– A</td>
</tr>
<tr>
<td>cubicle width**</td>
<td>1,000</td>
<td>1,000</td>
<td>800</td>
<td>2x500 mm</td>
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<tr>
<td>cubicle depth*</td>
<td>1,700</td>
<td>1,700</td>
<td>1,700</td>
<td>1,700 mm</td>
</tr>
<tr>
<td>cubicle height</td>
<td>2,300 up to 2,500 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* incl. control compartment H = 600 up to 800 mm

* plus 77mm for front door and back wall
** 2x500mm – contactor panel with a maximum of 2 outgoing feeders
Further values upon request
The switchgear that meets high-current requirements

- draw-out type switchgear system for the indoor installation, type-tested, factory-assembled, air-insulated, metal-enclosed with a fourfold compartment
- circuit-breaker in truck types starting at 3.150 A
- application as a single bus system or as a duplex system
- optional: motor operated withdrawable units and earthing switches

The following variations are possible for the conduction of hot gases that result from arc faults:
- deflector plate
- pressure release duct

Medium Voltage Switchgear NES-H18:

**Technical data: NES-H18**

<table>
<thead>
<tr>
<th>Rated values</th>
<th>up to</th>
<th>up to</th>
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</thead>
<tbody>
<tr>
<td>rated voltage</td>
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<td>17.5  kV</td>
</tr>
<tr>
<td>rated power-frequency withstand voltage</td>
<td>28</td>
<td>38  kV</td>
</tr>
<tr>
<td>rated lightning impulse withstand voltage</td>
<td>75</td>
<td>95  kV</td>
</tr>
<tr>
<td>rated busbar current</td>
<td>4,000</td>
<td>4,000 A</td>
</tr>
<tr>
<td>rated short-time withstand current</td>
<td>55</td>
<td>50  kA</td>
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<tr>
<td>rated peak withstand current</td>
<td>137.5</td>
<td>125  kA</td>
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<tr>
<td>rated short-circuit duration</td>
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<td>3  s</td>
</tr>
<tr>
<td>internal arc fault test 1 s</td>
<td>50</td>
<td>50  kA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dimensions</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>rated voltage switchgear</td>
<td>3,150</td>
<td>4,000</td>
<td>—— A</td>
</tr>
</tbody>
</table>
| rated branch current up to:
  (natural- / air cooled)           | 3,150 | 3,400 | 2,500 A |
| rated branch current up to:
  (forced ventilation)              | 4,000 | 4,200 | 3,300 A |
| cubicle width                      | 1,000 | 1,000 | 800 mm |
| cubicle depth*                     | 1,800 | 1,800 | 1,800 mm |
| cubicle height                     | 2,300 up to 2,500 mm |

* incl. control compartment H = 600 up to 800 mm

Further values upon request

* plus 77mm for front door and back wall
The compartments in accordance with the standard availability class LSC2B

A Busbar compartment
The busbars are made of standard flat copper with rounded edges. The main busbars are screwed together panel-for-panel and are segregated by cast-resin bushings panel-for-panel. The electric strength of the main busbar is guaranteed without additional insulation.

B Circuit breaker compartment
The withdrawable units can be equipped with a diverse amount of customer specific switching devices (vacuum, SF6). The operation of the withdrawable unit can only be done behind closed doors. Mechanical interlocks prevent maloperation. When removing the withdrawable unit, all live parts are automatically protected by metal shutters.

C Cable terminal compartment
The generously sized cable terminal compartment is easily accessible through its explosion proof front door. The panel’s entire depth can be used for the installation of instrument transformers, earthing switches, surge arresters and cable looms for single-core cables up to 5 x 500 mm² (NES) or 7 x 500 mm² (NES-H).

D Low voltage compartment
The low voltage compartment provides adequate space for all the necessary secondary technical components and can be delivered with the following heights: 600 mm, 700 mm, 800 mm. The withdrawable unit’s position switch, for example, is installed here for easy accessibility. This means that one can access it without coming in contact with the high voltage sections. The distortion resistant door is adequate for the protective relays, measuring instruments, controllers and signalling units.

Pressure relief
Pressure is generally released upward in our switchgear panels and not in the cable basement. We recommend that you use a pressure release duct for the targeted release in the switchgear building because of its utmost personal safety. The hot gases that result from arc faults can be conducted out of the switchgear building through the duct.

Depending on the type of switchgear panel, you can alternatively use an arc absorber or a deflector plate to release the pressure.
Electrotechnical Solutions under one Roof

NATUS products and services

**SWITCHGEARS** For decades we have been setting standards in innovation, safety and quality in our core business of switchgear systems.

**SERVICES** Our comprehensive service package leaves no wish unanswered – we do everything from assembly to maintenance and a 24-hour emergency service, right through to a comprehensive spare parts service.

**AUTOMATION** We are constantly developing reliable solutions that are specifically tailored to customers’ needs in the field of automation and control systems.

**SOLUTIONS** We combine the products of selected partners with NATUS services and a comprehensive project management to come up with professional solutions.

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